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| **Lesson Title: Spheres of Earth: Earth Systems and Features** |
| **Subject area / course / grade level: Science/ 5th Grade** |
| **Introduction: Just as our bodies have systems, so does our Earth. There are four spheres of Earth explored in this project: the atmosphere, biosphere, hydrosphere, and the litho/geosphere.**  **The atmosphere contains many gasses. It also includes weather events such as clouds, cyclones, dust storms, and hurricanes. Air pollution and aurora are also part of the atmosphere. The biosphere includes living systems, ecosystems and biomes such as, grasslands forests and deserts. The hydrosphere is associated with water in solid and liquid states, and includes rivers, lakes, oceans, and glaciers. The Litho/geosphere includes rocks, sediments and soils that create the Earth’s surface.**  **The atmosphere, biosphere, hydrosphere, and litho/geosphere are interconnected, and changes in one sphere will affect the others.** |
| **Lesson Length: Two fifty minute class periods.** |
| **Materials: Computer with internet access, projector, handouts of student manual (p. 1,3,7,11,13,14), Spheres of Earth Powerpoint, Gateway to Astronaut Photography of Earth** |
| **Lesson Overview: Students will become familiar with and participate in authentic investigations of Earth’s features and systems. Students will learn about the four spheres of the Earth and understand how the four spheres of the Earth are interrelated. Students will learn about the ISS and the data it collects and identify landforms as seen from space.** |
| **Tennessee Standards: GLE 0507.Inq.1 Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data, GLE 0507.Inq.3 Organize data into appropriate tables, graphs, and diagrams, GLE 0507.Inq.4 Identify and interpret simple patterns of evidence to communicate the findings of multiple investigations, GLE 0507.T/E.1 Describe how tools, technology, and inventions help to answer questions and solve problems, GLE 0507.7.1 Compare geologic events responsible for Earth’s major geologic features,** SPI 0507.7.1 Describe internal forces such as volcanoes, earthquakes, faulting, and plate  movements that are responsible for the earth’s major geological features such as mountains,valleys, etc. |
| **Lesson objective(s): Students will understand that Earth’s major systems are interrelated, identify features of the Earth and corresponding spheres, and relate new technologies, such as the ISS, with scientific research and study.** |
| **ENGAGEMENT**     * **Students will be shown a series of photographs from space and make observations about the features they see. They will chart their answers on the “Observation Chart” handout. The heading are blank and after observations are made, students will help guess where each heading goes. Display each of the four spheres of Earth on the board or on word cards, so students can help guess where each title should be placed.** * Students will relate the systems of the human body to the systems of the Earth, and understand that just as the balance of the human body requires that all systems are functioning in harmony so do the systems of the Earth. * Students will complete p. 3 of the Student Guide to demonstrate what they already know about the spheres of the Earth. |
| **EXPLORATION**   * Students will use the Gateway to Astronaut Photography of Earth to explore and observe different features of the Earth. Students will use p. 7 to log their findings. * Students should observe multiple spheres in many photographs. Ask students to notice how each sphere affects the others. Ask students to compare and contrast astronaut photos and topographic maps. |
| **EXPLANATION**   * Students will collaborate to share descriptions and sketches of different feature. Discussions among peers using p. 11 will bring discoveries and comparisons. * Some questions that may lead students to higher order thinking are: Which features seem to be the product of geologic events? How do atmospheric events affect the other spheres? Describe what would happen if the hydrosphere in your photo changed states. |
| **ELABORATION**   * Students will demonstrate a solid understanding of the Earth’s spheres and the investigative process by developing a question, and designing a possible investigation using p. 13. |
| **EVALUATION**   * Students will be informally and formally evaluated by observation and by completing a chart of the Earth’s systems without the aid of a word bank (p. 14). Students will complete a chart describing how Earth’s Spheres are all interrelated. |